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Optimizing Data Accessibility to Impact BCMA Compliance

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Executive Summary

Introduction of the Problem

There have been substantial developments in healthcare over the past three decades, including the introduction and integration of health information technology (HIT) such as barcode medication administration (BCMA). The purpose of introducing HIT into the healthcare setting is to reduce the occurrence of mistakes and patient harm (Lin et al., 2018). BCMA has been shown to reduce medication errors by electronically verifying the '5 rights' of medication administration—right patient, right dose, right drug, right time, right route (Shah et al., 2016). With BCMA technology, a nurse scans the patient's wristband and the medication to be administered, and the data is then delivered to a computer software system where algorithms check various databases and generate real-time warnings or approval (Shah et al., 2016). In addition to improving patient safety during the medication administration process, BCMA technology also generates data that can facilitate quality improvement efforts.

In a Midwest academic medical center, nursing leadership has identified a lack of immediate access to accurate BCMA data. Currently, quarterly reports are generated and disseminated to nursing leadership via email by the organization's Nursing Informatics Specialist (NIS). Nursing leadership may access BCMA compliance reports; however, some barriers exist related to accessibility to system reports; skill level to generate system reports; time constraints; lack of knowledge related to the reporting system; and the lack of formal standardized end user training. Additionally, despite high overall organizational BCMA compliance (>95%), medication administration errors continue to persist. Since data retrieval process is retrospective and reported quarterly, no 'real time' or actionable data is available to improve patient safety.

Literature Review

Adverse drug events (ADEs) are errors that can happen at any phase of the medication administration process and BCMA ensures that the five rights of administration are addressed and continues to be a core safety technology (FitzHenry et al., 2013; Van Ornum, 2018; Bowers et al., 2015; Early et al., 2011; Rack et al., 2012; Truitt et al., 2016). ADEs occur with alarming frequency and are amongst the most common errors that affect patients in U.S. hospitals (Truitt et al., 2016). The technology of BCMA has been estimated to increase safety by 26% to 32% (Harrington et al., 2013) and as high as 54% (Rack et al., 2012).

For many leaders, BCMA compliance rates at 90-94% may be acceptable; however, such a compliance rate may be indicative of over 500 unscanned events by a two percent change in compliance rate (Van Ornum, 2018). To improve BCMA compliance, a more robust report is needed to support the nurses' accountability and to be included during performance evaluations (Van Ornum, 2018). Additionally, EMR vendor standard reports should be optimized to generate meaningful reports that take into account medications that have technically complex build in the EMR (Van Ornum, 2018).

In a study unrelated to BCMA, Zhou et al. (2018) assert that analyzing and learning from medication event reports is important in order to prevent reoccurrence; yet, reviewing these reports can be time consuming. Their automated pipeline reports, when compared to the traditional manual review methods, was expected to save time and reduce workload; thus, be more efficient for those clinicians analyzing the data (Zhou et al., 2018). Auto-generation of data and auto-dissemination can help nurse leaders analyze the data in close to real-time and evaluate whether interventions are necessary to improve compliance and/or determine if there are issues that are contributing to BCMA noncompliance.

Methodology

The primary goal was to develop automated BCMA compliance reports and examine its impact on compliance data. Additionally, the authors sought to examine leadership's perception on the accessibility and usability of these automated BCMA compliance reports. As aforementioned, the setting is a Midwestern academic medical center. Institutional Review Board (IRB) approval was received from Southern Illinois University-Edwardsville and a letter of determination for exemption was received from the clinical site. Since the project did not directly involve human subjects, participant consent was not required. The project consisted of collaboration between Nursing Leadership, Information Services (IS), and the Doctor of Nursing Practice (DNP) team to develop and test the feasibility, accessibility, usability, and impact on automated BCMA compliance reports.

The small test of change was implemented on two hospital units, a Medical Surgical (MS) and Intensive Care Unit (ICU). Nursing leadership consisted of two Patient Care Directors (PCD) for each unit and one Clinical Nurse Consultant II for both units. The project implementation evolved into two phases. With the assistance of IS in the initial phase, an automated BCMA compliance report was developed for both units and delivered daily via email to nursing leadership. The second phase was implemented based on feedback from nursing leadership and consisted of consolidated weekly reports, which was generated by the authors without the assistance of Information Services (IS) department. To examine the impact of the reports, a comparison was made between the current process and project implementation. The System Usability Scale (SUS) was used to measure nursing leadership's perception regarding the reports accessibility and usability

Evaluation

A total of 111,669 medication administration events (MAEs) were analyzed beginning August 4th through December 14th. BCMA compliance data consists of two data points related to MAEs, percentage of patient wristband ID scanning (patient scan) and percentage of medications scanned (med scan). To evaluate the impact of daily automated and weekly consolidated BCMA compliance reports on overall BCMA compliance and clinical practice, the authors compared 8 weeks of baseline data (retrospective BCMA unit compliance) to compliance data during the project implementation (11 weeks) by using bar graphs. To evaluate nursing leadership's perception on the accessibility and usability of both the automated BCMA compliance reports and weekly consolidated reports, the authors employed the System Usability Scale (SUS).

For the initial phase, the daily automated report was an exact duplicate of the current report generated by the NIS, which includes overall unit BCMA compliance based on percentage of patient ID and medication scans. IS was able to duplicate the quarterly report in another reporting platform with automation capabilities. Additionally, the report details were extended to include the names of all staff associated with any MAEs and their individual compliance.

System limitations were identified with the automated report. The report was not able to exclude MAEs that were known not to scan in the EMR or administered in procedural areas that do not have BCMA technology; thus, negatively impacting an individual's and overall unit's BCMA compliance. The authors were unable to mitigate these issues due to the complexity of the automated report and resource availability from IS due to an organizational competing project. These limitations were addressed with nursing leadership during the first phase of the project.

A second, unplanned phase of the project was implemented based on feedback from nursing leadership. They requested a consolidated weekly report to identify trends among

individual staff. Due to IS resource availability, the authors manually generated these reports which were emailed weekly to the unit's leader every Monday. The weekly reports contained medication details of unscanned medications and patient IDs. Nursing leadership continued to receive the daily automated reports during this phase.

The combination of the both daily automated and weekly consolidated reports yielded small improvements which is of clinical significance. When compared to baseline data by unit staff, there was a 1.61% increase in patient ID scanning (97.03% → 98.64%) on the MS unit, and a 1.52% increase in medication scanning (96.62% → 98.14%). In the ICU, there was a 0.51% increase in patient scanning (96.49% → 97.00%) and 0.40% increase in medication scanning (95.69% → 96.37%). Although the increase in percentages for scanning compliance were small, the change in percentage translated to 494 additional medication scans during the project; therefore, reducing the risk of an ADE related to the medication administration process.

Optimization of BCMA data accessibility had an impact on BCMA compliance, but it varied depending on the needs of the nurse leader. The ICU PCD had emphasized the need for a weekly report, whereas the MS PCD was primarily focused on data accuracy. BCMA compliance for the MS unit increased immediately with the project implementation and remained stagnant with the weekly reports. Conversely, the ICU had a decline in compliance with the automated daily reports but had a remarkable improvement with the implementation of the consolidated weekly reports.

Finally, nursing leadership's perception related to the usability of the reports was measured by SUS. The 10-item questionnaire allows the leader to rate their agreement with items on the scale (Usability.gov, n.d.). The scale was administered twice by using the Qualtrics platform via an anonymous link at the end of phase 1 and phase 2. The response rate was 100%

for both surveys. Results of the SUS showed large range of variance in usability for the automated daily (42.5, 47.5, and 90) and consolidated weekly reports (57.5, 87.5, and 92.5). The average of the daily automated report was 60; whereas the weekly report was 79.2. The median score of the daily automated report was 47.5; whereas the weekly report was 87.5. Based on research, a SUS score above 68 has been recognized as above average and a score below 68 is below average (Usability.gov, n.d.).

Impact on Practice

As a result of this small test of change, there were a total of 494 additional medications scanned. A small percentage difference in compliance can translate to thousands of patient and medication scans and decreased ADEs annually. The authors predict that continuing to optimize data accessibility on the two units can easily translate to approximately 3,000 additional scans over a course of a year; therefore, clinically significant since BCMA has been shown to improve patient safety during the medication administration process. Finally, system limitations need to be accounted for and analyzed by subject matter experts when creating systems or tools for quality review. Inability to expand the project organizationally was prohibited by an EHR transition which limited IS resources needed to create the automated process to all unit leaders.

Conclusions

Technologies like BCMA augments clinical practice and facilitates the provision of safe quality care. Like many other HITs, BCMA generates an abundance of data that can be used to monitor clinical processes and compliance and drive quality improvement efforts to improve patient safety. Without immediate accessibility to BCMA compliance data, nursing leadership are unable to proactively engage in efforts to improve patient safety during the medication

administration process. Despite favorable compliance percentages that range in mid-90s, the small percentage of noncompliance can translate to hundreds of patients or medications not scanned, which can lead to ADEs and/or unfavorable patient outcomes. By optimizing data accessibility related to BCMA compliance, nursing leadership can closely monitor a process that improves patient safety during the medication administration process.

Nursing leadership is a key stakeholder in developing optimization efforts; therefore, the authors recommend that they are included in projects to ensure that the implemented product is not only meaningful but results in improved patient outcomes and a decrease in ADEs. The need for data accessibility was evident throughout this project. Despite being a small-scale test of change, the authors conclude that optimizing data accessibility to BCMA compliance can lead to improved BCMA compliance.